

Running Head: PIT IMPACT IN THE ED

The Impact of Implementing a Provider in Triage in the Emergency Department on
Overall Length of Stay and Frequency of Patients Leaving Without Being Seen
DNP Final Project

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By

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Abstract

Hospital emergency departments are experiencing overcrowding across the United States, which causes adverse effects such as increased patients leaving without being seen, increased length of stay, and prolonged wait times. A local emergency department (ED) is experiencing an increase in the numbers of left without being seen (LWBS) patients. The effects can be detrimental for the patient, and organization.

As a departmental intervention and quality improvement study, a provider was in triage for a trial period of five days during the highest volume hours. The purpose of this project is to determine if the impact of implementing a provider in triage (PIT) reduces the frequency of LWBS patients, and/or decreases the length of stay (LOS) for discharged patients. The data obtained shows a positive impact of the PIT on LWBS rates as it decreased from 11.6% to 3.5%, decreased LOS for discharged patients of 57.8 minutes, and decreases lost revenue by \$109,480.

Acknowledgements

I would like to acknowledge my committee members for the time, hard work, and confidence they have had in me throughout this process. Your guidance, encouragement, and drive have kept me motivated through this program. Your knowledge is immense, and the dedication you display is admirable. I appreciate everything you not only did for me, but the education that I obtained that will be a lifetime resource. Thank you!

Dedications

This paper is dedicated to my son, Cameron. You are my reason for doing everything in this life, and my encouragement. I am truly blessed to have you as my son. We have been through it all as a team, and will always be that. Love you to the moon and back. You are my rock.

To my mother: I have had an amazing role model in you, and realize everything you taught me as I was growing up was so I could be a successful adult. You pushed me to be my best, and encouraged me to reach for the stars. I appreciate the goals and values you instilled within me, and understand the sacrifices you made for us as a mother. I love you. You are the greatest role model I could have asked for.

Chapter One: Introduction

Problem

Patients who present for treatment at the Emergency Department (ED) are greeted by registration and the appropriate information regarding the reason for the visit is placed into the electronic medical record (EMR). The patient is then triaged by a registered nurse (RN), assigned an acuity status, and then asked to wait in the lobby for a bed assignment. Once the ED bed assignment is obtained, the patient is roomed and a provider assigns themselves to their treatment care team. The provider selects a patient assignment based upon patient acuity level. The patients with the higher acuity (such as a level 1 or 2) are selected first. Upon completion of an exam, testing, and symptomatic management, a disposition status is placed in the EMR. A registered nurse then completes the disposition.

At a local inner city Emergency Department (ED), there has been a notable increase in the percentage of patients leaving without being seen (LWBS). In November 2012 the LWBS percentage of patients that signed in for treatment for the month was 3.5% of all patients registering for treatment, with a length of stay (LOS) of 69 minutes prior to leaving without being seen, and 2.6% in December 2012 with an overall length of stay of 68 minutes.

In November 2013 the LWBS rate was 2.6% and 2.9% in December, with LOS being 58 and 76 minutes respectively. However, in 2014 there was a spike in these statistics. The LWBS rate in November was 4.5% and 7.12% in December 2014. In 2015, March LWBS rate was 8.26%, 7.54% in April, 7.3% in May, 7.3% in June, and 9.3% in July (Figure 1). The national benchmark for patients LWBS in the

emergency department is 2% (Hayden, et. al., 2014). Improving this number in this specific ED population of reference to be closer to the national benchmark would represent best practice.

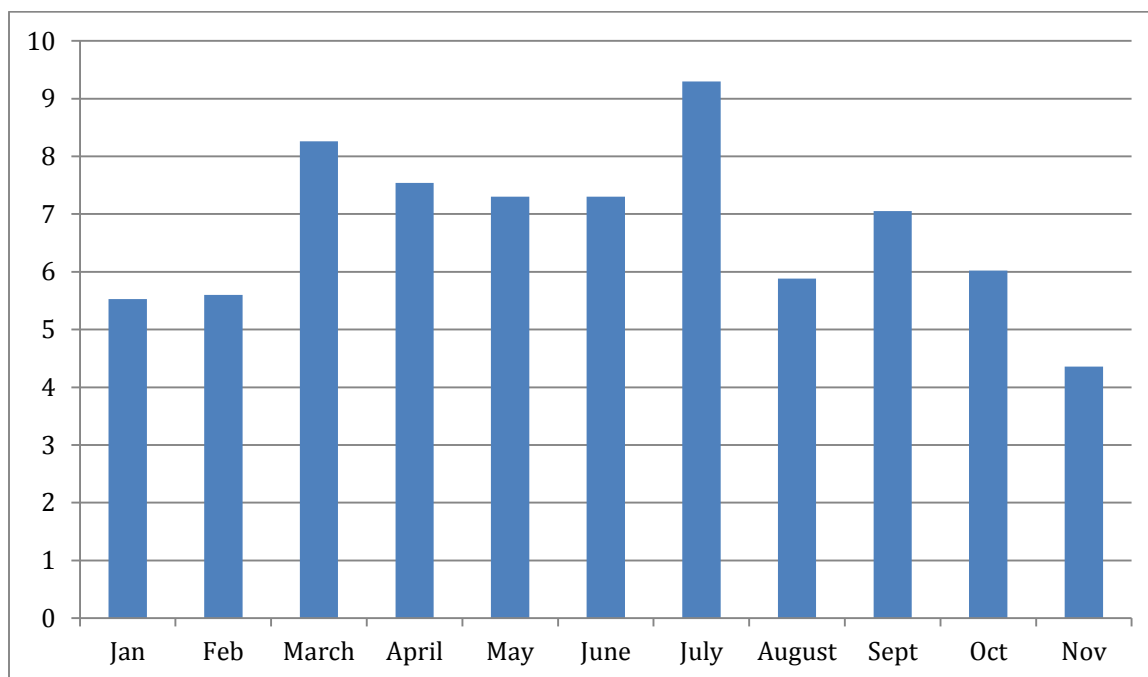


Figure 1. Percentage of patients who left without being seen (LWBS), January, 2015-November, 2015. *National benchmark < 2%.

According to ED administration, most LWBS patients are Emergency Severity Index (ESI) acuity level 3 (Figure 2). The categories of patients in this subsection include abdominal pains, low risk chest pains, symptomatic hypertension, stable COPD patients, etc.

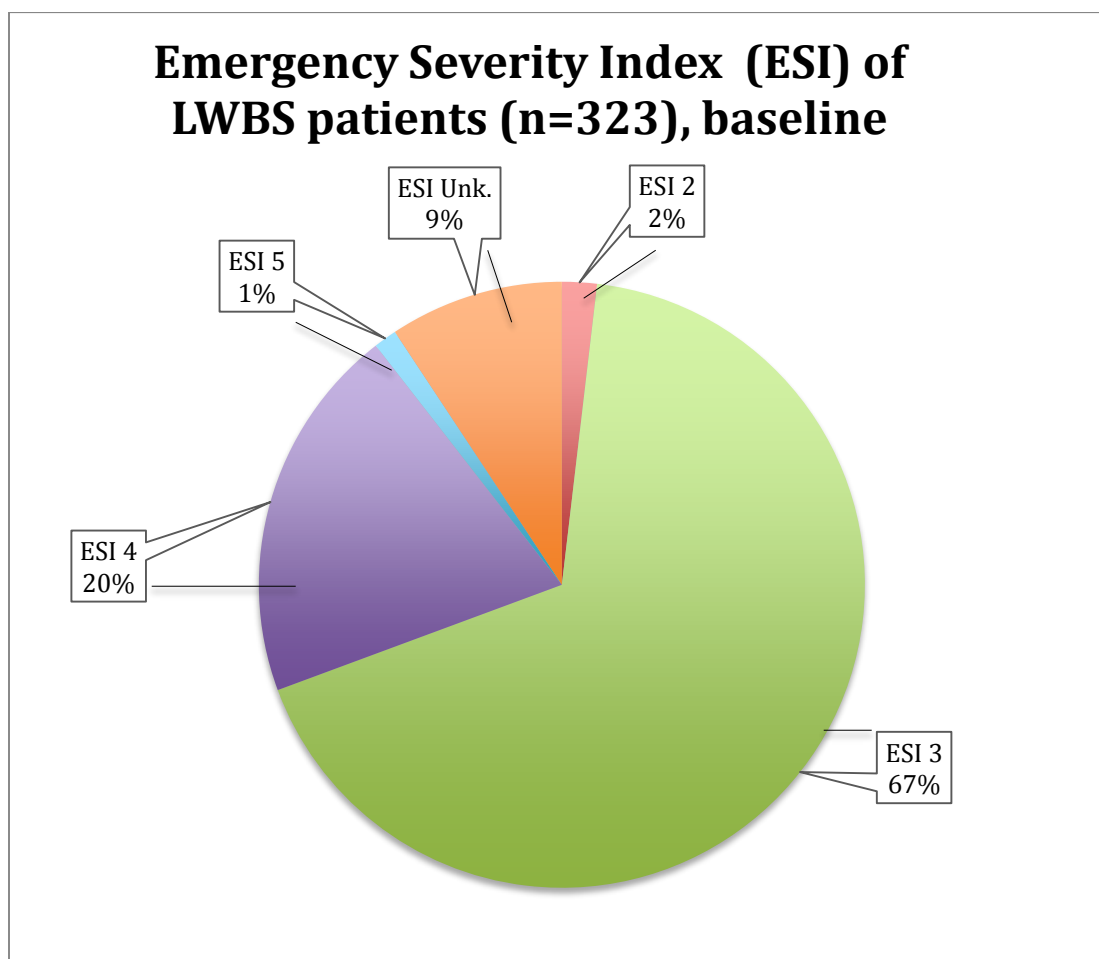


Figure 2. Emergency Severity Index Acuity of Patients who left without being seen (LWBS), December, 2014. ESI 1: Life-threatening, ESI 2: Emergent, ESI 3: Urgent, ESI 4: Non-Urgent, ESI 5: Stable, ESI unk: unassigned

Figure 3 outlines the ESI triage categories (www.esitriage.org). A patient who leaves the ED without evaluation represent lost revenue, may have acute or life-threatening conditions and LWBS is a missed opportunity to provide care to these patients.

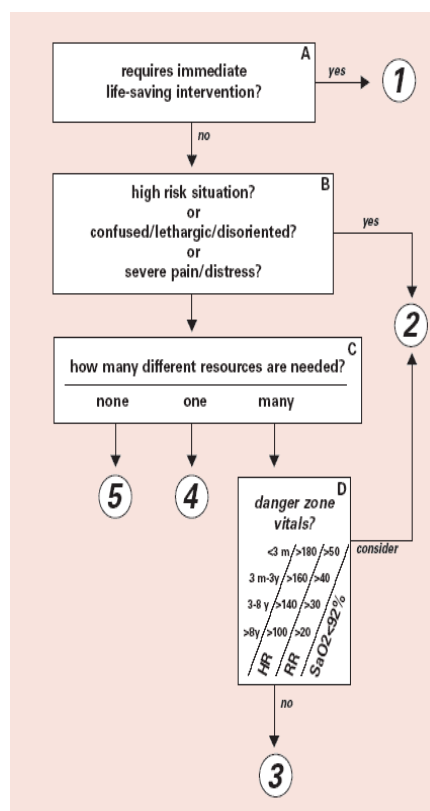


Figure 3. ESI triage acuity assignment recommendations.

The discharge length of stay (LOS) is defined as the time from the patient enters the doors of the ED and getting triaged until they are discharged from the emergency department. This includes their length of stay in not only the room while being evaluated but also for the triage wait times. Since 2012, there has been a steady increase from 175.1 minutes in November 2012, to 221.16 minutes in December 2014 demonstrating the need for an earlier intervention.

Purpose

In this inner city emergency department, LWBS rates are increasing, and LOS is extending, which can have detrimental effects for the patient and hospital organization. As a departmental intervention, a provider will be placed in triage for a one-week trial period. The purpose of this pretest/post test study is to determine if the impact of implementing a provider in triage (PIT) reduces the frequency of LWBS patients, and/or decreases the LOS for discharged patients.

The purpose of utilizing a PIT is to evaluate the impact of a departmental PIT on length of stay for discharged patients and percentage of patients leaving without being seen. The impact of utilizing a PIT would be shared with the ED directors to determine if full time implementation is the best evidence based practice for this ED to improve LWBS and LOS and if a longer trial period is warranted.

Significance to Healthcare and Consistency with DNP Essentials

Despite significant research to support the effectiveness of a provider in triage on overall length of stay and patients leaving without being seen in the emergency department, this particular emergency department does not utilize a PIT. In this inner city emergency department, LWBS rates are increasing and LOS is extending which can have detrimental effects for the hospital organization. Not only would implementation of a PIT provide quicker access to a provider for patients, but might also better serve the patients and community by decreasing the LWBS rates and LOS overall. Studies have shown that with changes to the triage process, there is the potential to decrease wait times and length of stay in the emergency department (Horwitz, Green, & Bradley, 2010).

DNP essentials

This study correlates to the Doctorate of Nursing Practice (DNP) essentials, as outlined by the AACN (2006). The correlations are as follows:

Essential I: Scientific based theories are being utilized in order to enhance the delivery of healthcare in the emergency department, and evaluate the outcomes of the future intervention. Previous research and theories are being utilized in order to develop the plan for the PIT in this emergency department.

Essential II: Understanding of the cost versus benefit analysis of the PIT, in order to promote a higher quality of care and quicker access to care is being initiated. This delivery of care approach will help to meet the demands of the emergency department, and needs of the patients/community. The study results will be communicated with the emergency department directors and management in order to facilitate effective and successful implementation.

Essential III: The information being obtained will be applied appropriately to guide the development of the PIT full-time to improve evidence-based practice, predict the outcomes of implementation, and identify potential gaps in the implementation evidence. The goal is to utilize these findings to improve not only patient outcomes but outcomes for the organization by decreasing the frequency of LWBS and overall LOS.

Essential IV: Upon completion of this study, once the PIT is able to be implemented full-time, the data can then be evaluated to determine its reproducibility in comparison to the pilot study on care and quality improvement for the system and patients.

Essential VI: The information obtained through the comparison dates will be communicated to the directors and management of the emergency department in order to collaborate for the development of an effective plan for implementation of a PIT permanently, and to review the effectiveness through data analysis, standards of care by the PIT, and practice guidelines.

Essential VII: This study will help to address the gap in care for the patients leaving without being seen. They are at risk for detrimental outcomes due to reported LWBS because of long wait times (AACN, 2006).

Project Objectives

The emergency department is a location patients seek to have their health concerns addressed. The amount of patients leaving without being seen (LWBS) is on the rise and can have negative consequences not only for the patients but the hospital organization as well. The objective of this study is to evaluate clinician directed triage to determine its impact on reducing length of stay for discharged patients and percentage of patients leaving without being seen.

Definition of Terms

The provider in triage (PIT) will be defined as a nurse practitioner, physician's assistant, resident, or attending physician. The PIT would be placed in triage in one of the triage bays in order to see patients after they have been triaged by the registered nurse. If there is an open bed, the patient will not be held in the waiting area by the PIT. However, if there is a wait, the PIT will see the patient in triage based on acuity level. The patient will have a brief history and pertinent exam, then appropriate anticipated testing will be ordered. The patients will not

have CT scans requiring oral and IV contrast in the lobby, or intravenous medications due to the need for close monitoring. However, labs, x-rays, non-contrast CT scans, could be initiated while waiting for a room assignment.

Patients are designated as left without being seen (LWBS) when their names are called on three occasions, and they do not answer. The time is then documented in the electronic medical record (EMR) that is used in the ED, along with the time that they are removed from the computer as noted having left.

The discharge length of stay (LOS) would be defined as the time from the patient entering the doors of the ED and signing in, until they are discharged from the emergency department. This includes their length of stay from triage wait times and includes the time spent in the room being evaluated.

Chapter Two: Review of Literature

Related Research

Patients who present to Emergency Departments (ED) have self-identified emergent or urgent health concerns. In the United States in 2011, there were 136.3 million ED visits annually (CDC, 2011); there was a 20% increase in ED visits from 1995 to 2005 (Welch, 2012), and 69% of EDs are “over capacity.” Upon arrival to an ED, patients are typically classified by their severity of illness according to the triaging guidelines.

One barrier to accessing emergency care for patients in the ED is wait time. For multiple reasons, including prolonged waits, some patients elect to leave the ED setting. Patients who leave without being seen (LWBS) have been identified as an important measure of ED quality. A study completed by Horwitz, Green, & Bradley (2010) report that emergency departments in the United States are performing poorly in regards to wait times for patients and their overall length of stay in relation to the most acutely ill patients.

Patients who leave the ED without evaluation represent lost revenue, may have conditions that are acute or life-threatening. Moreover, LWBS is a missed opportunity to provide care to these patients. The American Hospital Association reports 38% of hospital EDs are operating at a level at or over capacity in the United States (American Hospital Association, 2011). In addition, studies report that overcrowding of the emergency departments can cause negative effects on patient care. For example, longer times to first antibiotic administration in patients with pneumonia, longer treatment times for chest pain patients, and even increased

mortality rates (Fee, et. al., 2007; Schull, et. al., 2003; Schull, et. al., 2003; Richardson, 2006; Schull, et. al., 2004; Dierks, et. al., 2007; Pines, et. al., 2006) can have disastrous effects on patient outcomes.

Excessive wait time is the most commonly reported reason for patients leaving without being seen (Kennedy, et. al., 2008). There are numerous case reports cited that illustrate the risk of a poor clinical outcome when a patient spends excessively long periods of time in an ED waiting room prior to an medical screening exam being completed. Welsh and Davidson (2010) cite an incidence where a woman was reportedly triaged as a lower risk chest pain, waited in the lobby for greater than two hours, and passed away in the lobby, unable to be resuscitated. The hospital was then charged with her death. Other cases report delayed times to antibiotic treatment in pneumonia, longer times in pain with fractures, possible surgical emergencies developing if an appendix would rupture, and other such events (Welch & Davidson, 2010). In addition, there is always a risk for a serious adverse outcome when a patient leaves the ED prior to completion of evaluation and treatment such as death from a potential health complication such as a myocardial infarction, sepsis developing from an untreated urinary tract infection or pneumonia, infertility from untreated pelvic inflammatory disease, return to the ED with more serious complaints at a later date secondary to not having treatment for the initial complaint, etc. (Kennedy, et. al., 2008)."

Hospital revenue is a concern regarding the LWBS population. It is estimated that each patient brings approximately \$500 average to the hospital from an ED visit; this could result in an upwards of \$1 million per year lost. In addition, if any of

these patients would have been admitted to the hospital, it is estimated each admission could generate \$10,000 in revenue. One study reported as much as \$1,115,455 lost annually for their 1,193 patients who LWBS that year (Russell, et. al., 2013). The impact on the hospital revenue is both noticeable and detrimental to the system. If this could be decreased in any manner, it would be beneficial to the organization (Herman, 2014).

Multiple factors contribute to prolonged wait times and LWBS patients. Specifically, the increase in the overcrowding of the emergency departments causes longer patient stays, increased amount of patients leaving without being seen, patient dissatisfaction, and complications with ambulance services being able to bring patients for evaluation and care (Bernstein, et. al., 2009).

One solution to LWBS and excessive wait times is to utilize clinicians (advanced practice providers and physicians) in the triage area. The use of clinicians in ED triage areas has been successful in multiple studies that have reviewed the provider in triage (Sharieff, et. al., 2013; Han, 2010; Partovi, et. al., 2001; Holroyd, et. al., 2007; Terris, 2004; Subash, et. al., 2004; Choi, et. al., 2006). One study suggested as much as a 44% decrease of LWBS, and 42 minutes shorter length of stay, and patient satisfaction was increased. (ED Management, 2007). In a retrospective observational study performed by Rogg, et. al. (2013), placing a physician in triage to begin care orders positively impacted the ED in the areas of average LOS, frequency of patients LWBS, and door to room time.

Evidence is indicating that innovations in the intake process can positively impact the overcrowding of EDs (Eitel, et. al, 2010). A provider in triage has shown

positive impact in multiple regions including, but not limited to, California, Virginia, North Carolina, Louisiana, Texas, Tennessee, Arizona, New York, and Missouri (Bahena & Andreoni, 2013). A retrospective survey study of patients who left without being seen report they would have been more likely to wait if communication of time expected to wait and minor treatments being immediately available were provided (Arendt, et. al., 2003).

It is reported that residents (Weston, et. al., 2014) and advanced practice providers have a similar impact as physicians in triage on the decrease in times (Nestler, et. al., 2012). Time from registration to the time the patient's saw a physician was decreased a significant amount, as much as 36 minutes. In addition, length of stay was decreased, diversion days and times were decreased and there was a reduction in the amount of patients leaving without being seen by a provider (Imperato, et. al., 2012). Han (2010) reported a decrease in the length of stay decreases among patients who were ultimately discharged from the ED, but not among patients who were admitted to the hospital. This study demonstrated significant decreases in the left without being seen population, along with diversion rates (Han, 2010).

Theoretical Framework

The project is based upon the IOWA model of theoretical research. In Step one of the IOWA model, selection of a topic is the goal. The topic at hand was selected due to its magnitude of importance related to the frequency of patients leaving prior to being seen and the need for an intervention to reduce these frequencies in order to reduce potential detrimental situations for the patient and

loss of trust and revenue for the hospital. The evidence supports the impact of a provider in triage on the frequency of patients leaving without being seen. The purpose is to determine its potential impact in this particular emergency department.

In step two, a team needs to be formed. The team for this study includes the registered nurses, advanced practice providers, the ED director, nurse manager, and physicians who will be collaborating during the trial period. They are the individuals who will need to determine if this change is amenable to practice full time, and the impact it could potentially have for our patients. Once the trial period is completed, the data will be analyzed in comparison to the prior week where no PIT was utilized.

In step three, evidence retrieval is necessary related to the topic at hand. This will be completed for the purposes of this project and shared with the director of the department, and nurse manager. With completing the literature review for this project, the evidence was graded, as step four of the IOWA model describes, in order to determine the strength of the project. The literature supports the effectiveness and appropriateness of a provider in triage in the emergency department.

Following completion of the project, steps five and six will be completed. The project results will determine the potential impact of the provider in triage in the emergency department by after the department performs a pilot trial for a week. Upon summarizing the results, potential long-term benefits will be discussed in order to determine next steps. Upon completion of the project, the summarizations

will be given to the department director and nursing manager. If it is determined that a PIT position is favorable, an evidence-based practice standard will be developed and the provider in triage will be implemented. Although step seven will not be completed during the terms of this project, future steps could be completed, including an assessment of the long-term impact on LWBS, LOS, patients satisfaction, and cost after a twelve month time frame following implementation of the provider in triage (Doody & Doody, 2011).

Chapter Three: Methods

Project Design

As a departmental intervention, the provider in triage will be implemented for five days (Monday through Friday) during the hours of eleven am until seven o'clock pm, as this includes the largest portion of high volume hours. This study, following this pilot intervention, will be to evaluate its impact on overall length of stay, and LWBS rates. If barriers are observed during this trial, they will be summarized.

The project will use a quasi-experimental approach in that it will lack random assignment, as all patients waiting in the lobby on the days of assigned intervention would be included. If there is no wait, and an ED room is available, the patient will not be stopped by the PIT for evaluation. A pre-test, post-test design will be incorporated. The information pre-test is readily available on the facility web portal for comparison. The information from post-intervention will be obtained in a similar fashion utilizing the assistance of ED administration.

The project setting is an inner city emergency department, in Ohio. This emergency department has seen an increase in the number of patient visits within the month of December 2014 (Figure 4), but in addition, a drastic increase in the number of patients leaving prior to be evaluated by a healthcare professional (LWBS). These patients are at risk of health demise, and potential dangers of not having their emergency evaluated. Methods are being sought in order to decrease this frequency, to provide better access to emergency care to the patients of this ED.

The patients of this emergency department vary from primary care type visits (such as medication refills and colds), to stab wounds and myocardial infarctions. These patients range in insurance from self-pay, to Medicaid/Medicare, to private insurance. The ED is a twenty-five bed department, with four of these beds being ran as a “fast track,” or urgent care type setting from 9 o’clock am until 7 o’clock pm. Admitted patients will not be included in the project results.

The Quality Improvement and Feasibility review was sought from the medical center. The proposed study was determined as eligible for quality improvement as the emergency department snapshots for the department are being utilized to analyze the impact and no patient specific data is examined. The study at hand will involve departmental change and evaluation, not direct patient interventions at this time. The concept of PIT has been investigated and reported in prior studies and is a common intervention implemented in the ED. This will determine if this EBP concept is applicable to this environment and population.

Sample

In the project, a non-probability convenience sample will be utilized. The most accessible and valuable sample participants will be the patients waiting in the lobby of the emergency department for a room assignment to begin care and who would be directly affected by the PIT implementation. There will be no random selection as all patients waiting for a bed assignment will be approached for evaluation and included.

The patients of this population setting are unique. They vary in the types of insurance from self-pay, Medicare/Medicaid, to private insurance. The area is in an

impoverished region, and the resources can be scarce for many patients, which frequently results in repeat visits and compliance concerns.

Setting

The project setting is an inner city emergency department which has experienced an increase in the number of patient visits within the month of December 2014 (Figure 4), but in addition, a drastic increase in the number of patients leaving prior to be evaluated by a healthcare professional (LWBS). The average volume for this ED from December 2014 until November 2015 was 4400 patients arriving for care, per month. These patients are at risk of health demise, and potential dangers of not having their emergency evaluated. Methods are being sought in order to decrease this frequency, to provide better access to emergency care to the patients of this ED.

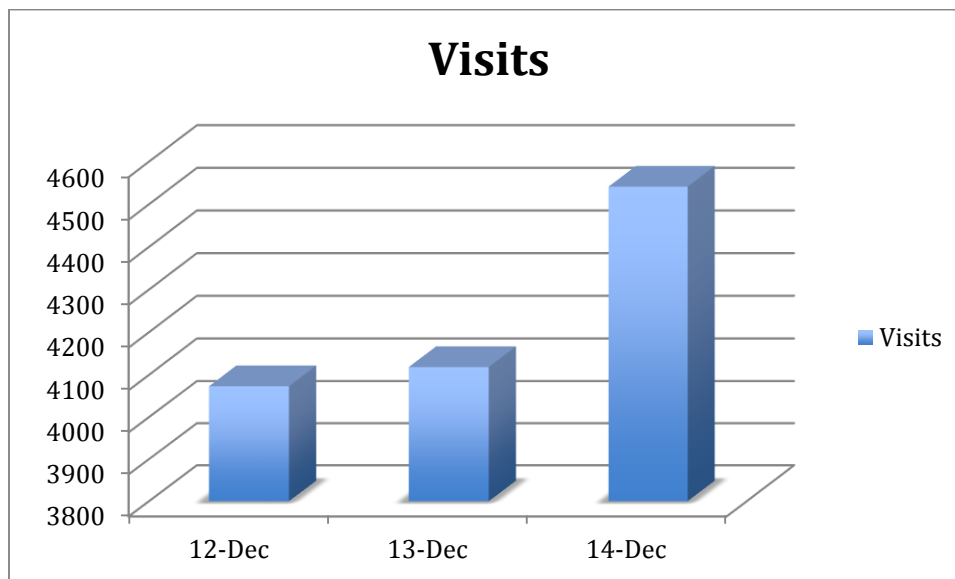


Figure 4. Number of baseline emergency department visits per month

Methods

Prior to implementation of the PIT, barriers and external variables were addressed to decrease associated complications and improve reliability. A triage refresher course and testing were administered to the RNs of the ED in order to increase reliability of the assigned acuities between staff. In addition, spacing concerns were addressed to determine how the flow would occur, and how to use the space efficiently. The PIT ultimately went into the triage room with the RN to improve flow and decrease question duplicity. A pyxis medication storage system was placed in the unused space, along with mobile computers for use by the PIT and their assigned RN.

For the project, the PIT was the investigator, who is a certified nurse practitioner. The investigator was not compensated for this intervention trial period. The trial period was on the days of Monday through Friday. The shift focused on as much of the day that shows the highest volume of patients according to the ED nurse manager; the PIT shift was from eleven o'clock am until seven o'clock pm.

Patients who present for treatment at the emergency department are greeted by registration to have a quick registration completed to place them into the EMR, be triaged by a registered nurse (RN) and be assigned an acuity based upon their complaint. Upon completion of the triage by the RN, the patient might be sent back to the lobby to await their room assignment or evaluation by the PIT. If there is a bed available for the patient to be placed in, the PIT will be bypassed and their treatment will begin immediately.

The PIT presented to the triage room with the RN to listen to the chief complaint and past medical history. The triage rooms ensure confidentiality, as they have blinds, and closable wooden doors. The PIT would then perform a very focused abbreviated exam (focused only on complaint system), and order the appropriate testing (Figure 5). For example, if a patient presented with a chief complaint of productive cough for the last two weeks with altered breath sounds in the right lower lung, they would order a chest radiograph. Or, if the patient was complaining of abdominal pain with vomiting and diarrhea, they may order a urinalysis, and basic labs while in the lobby to be drawn. In addition to labs and imaging studies, the PIT ordered non-controlled medications, continuing to act within their scope of practice. For example, Zofran for nausea and vomiting, levsin for abdominal cramping, ibuprofen for pain, Tylenol for fevers.

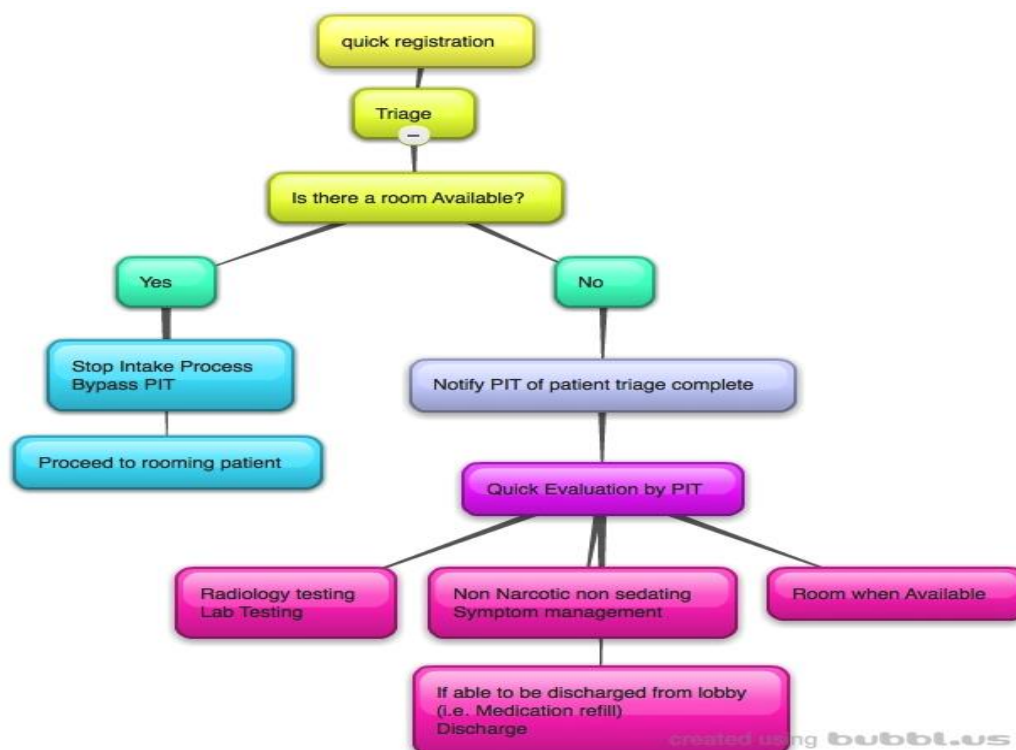


Figure 5. Process for provider in triage intervention

Although the PIT would have the ability to perform an abbreviated exam and start interventions in the lobby for the patients (Table 1), safety nets remain in place for higher acuity patients. If a patient is unstable or in imminent danger, the current process is to immediately place them in a room for evaluation. Even if this means reassigning patients who are already in a room who are potentially up for discharge, or are more stable than the patient in the lobby, the unstable patient is roomed immediately. This process will remain the same. If there is an unstable patient in the lobby, they will be roomed immediately, without delay.

Table 1. Provider in triage (PIT) scope of practice (examples). High-risk medications such as nitroglycerin or controlled substances were not considered part of the PIT scope

Intervention type		Examples	
	Symptomatic medications		Zofran, Levsin, Ibuprofen, Tylenol
	Laboratory testing		Labs (CBC, CHEM7)
	Diagnostic Imaging		CT scan (non-contrast), x-ray, doppler ultrasound
	Focused Physical Examination		Abdominal exam for vomiting, pulmonary exam for shortness of breath

The PIT would then potentially have the results of the labs/imaging studies ordered by the time the patient is roomed for a full evaluation by an advanced practice provider (APP), resident, and/or physician. The patient could then be informed of their results, have a full exam to ensure no additional testing is necessary, and have symptomatic interventions as applicable.

Informed consent will not be necessary as the PIT reflects a change in

staffing. Overall, the triage process will remain the same for the patients, simply adding the intake step of the PIT. The patients will not be placed at risk due to delayed triage since triage will be completed first.

Instruments

The emergency department summary sheets of daily visits, otherwise known as the ED snapshots, will be obtained for the intervention week, and the prior non-intervention week for pre-test comparison, in order to see the effects that the PIT has on overall length of stay of discharged patients and percentage of patients LWBS. Only the discharged patients would be included in the LOS evaluation omitting the patients being admitted to the hospital. These ED snapshots include daily breakdowns of data including the number of arrivals for the day, number of patients LWBS, numbers of admits, number of diversion hours for ambulances, LOS for admitted patients, LOS for discharged patients, and overall LOS.

Data Analysis Plan

The pre-project information is available for evaluation through collaboration with the ED director and management. The information describing the need for intervention is readily attainable via the facility's employee internet portal. The post-test information will be requested from administration to compare the ED snapshots from the week prior to intervention, to the intervention week. The days of comparison will be Monday through Friday for each week.

The project will be a pre-test/post-test evaluation. The information collected is from the ED population and is assessed pre and post intervention to determine the potential impact. The ED trends have been reviewed based upon information

provided by managers of the department at meetings and information that is readily available to staff on the medical system web-portal in order to support need of intervention feasibility.

The data will be stored on a USB port. The information will not contain any patient information as the data collected will be departmental data and contain no patient sensitive information. The director of the emergency department has been consulted and agrees with trialing of the PIT initiation as does the nursing manager for the department.

Chapter 4: Findings

Outcome Measures

The primary outcome measures for this project were the change in the left without being seen (LWBS) rates and the overall length of stay (LOS) in minutes for patients during the trial period of a provider in triage (PIT). A chi-square test of independence was used to analyze the impact on LWBS rates as the data from the two separate weeks of comparison are independent of each other. The LOS impact was analyzed utilizing a paired t-test. A paired t test was utilized in order to compare the mean LOS for each individual day of PIT with the mean LOS for the administrative aggregate data of the previous week's coinciding days. This test was utilized in order to compare the means of the PIT intervention LOS with that of the previous week as a continuous variable to determine the statistical significance of the change from the intervention. It assists with determining if the LOS differs between the control group and the group that received the PIT intervention

Data for comparison of the week of PIT intervention and the comparison week prior was obtained by the emergency department (ED) administrative staff for analysis of significance of PIT impact. The data was outlined on an ED snapshot that discussed each individual day's LWBS rates, total number of patients seen, and total LOS for patients. The information was divided into a LOS for admitted patients and LOS for discharged patients. LOS for discharged patients in minutes was utilized for this study.

Results

During the five day PIT implementation intervention, a total of 182 patients were seen by the PIT between the hours of 11 o'clock am and 7 o'clock pm. In comparing the control week (PIT intervention week totals) with the planned comparison, there was an improvement in LWBS rates. The LWBS rate during the control week was 25 with a LWBS rate of 93 in the planned comparison.

Using a chi-square test of independence, the planned comparison week was compared to the provider in triage (PIT) week to determine effects on left without being seen (LWBS) rates. The patients LWBS on Monday through Friday in the PIT intervention group, along with those who did not LWBS, were compared to the week prior planned comparison group of Monday through Friday days, LWBS and those who did not LWBS. The results show a chi square value of 34.481, or $P < 0.005$ with statistical significance (Table 2).

Table 2. Comparison of patients who left without being seen (LWBS) for provider in triage (PIT) intervention week compared to LWBS patients during control week before intervention. The data was used from Monday-Friday only.

Category	LWBS	Did not LWBS	Total
Intervention Week	25 3.5%	689 96.5%	714
Comparison	93 11.6%	709 88.4%	802

Chi Square = 34.481 (1df), $p < 0.005$

The PIT week actual LWBS daily frequency was compared with the expected LWBS rates based upon the comparison week prior's percentage of LWBS of 11.8%. Using a chi-square test of independence, the provider in triage (PIT) week was

analyzed to assess the observed and expected patients who were seen and left without being seen (LWBS). The results show a chi-square value of 45.861, statistical significance with a $P < 0.0005$ (Table 3). The expected patients results were based upon the previous week's percentage of patients LWBS of 11.6%.

Table 3. Comparison of provider in triage (PIT) week of patients who left without being seen (LWBS) observed, in comparison to expected based upon percentage of LWBS of week prior comparison week, which was 11.6%.

Category	Observed	Expected
Seen	689	631
LWBS	25	83

Chi-square value = 45.861 (1df), $p < 0.0005$.

LOS for discharged patients during each day of the PIT intervention week was compared to the coinciding day for the comparison pre-intervention week LOS. The LOS for discharged patients alone improved each day.

A paired t-test was used to compare length of stay for the provider in triage (PIT) intervention group and the comparison week was compared. The length of stay (LOS) for the patients during days Monday through Friday of the PIT week was compared to the LOS for patients seen Monday through Friday in the comparison or prior week. The average LOS for all patients in these two groups is listed in minutes, (Table 4). The results show statistical significance with $P = 0.0097$.

Table 4. Mean length of stay (LOS) in minutes for discharged patients in the week of the provider in triage (PIT) intervention, compared to the comparison week.

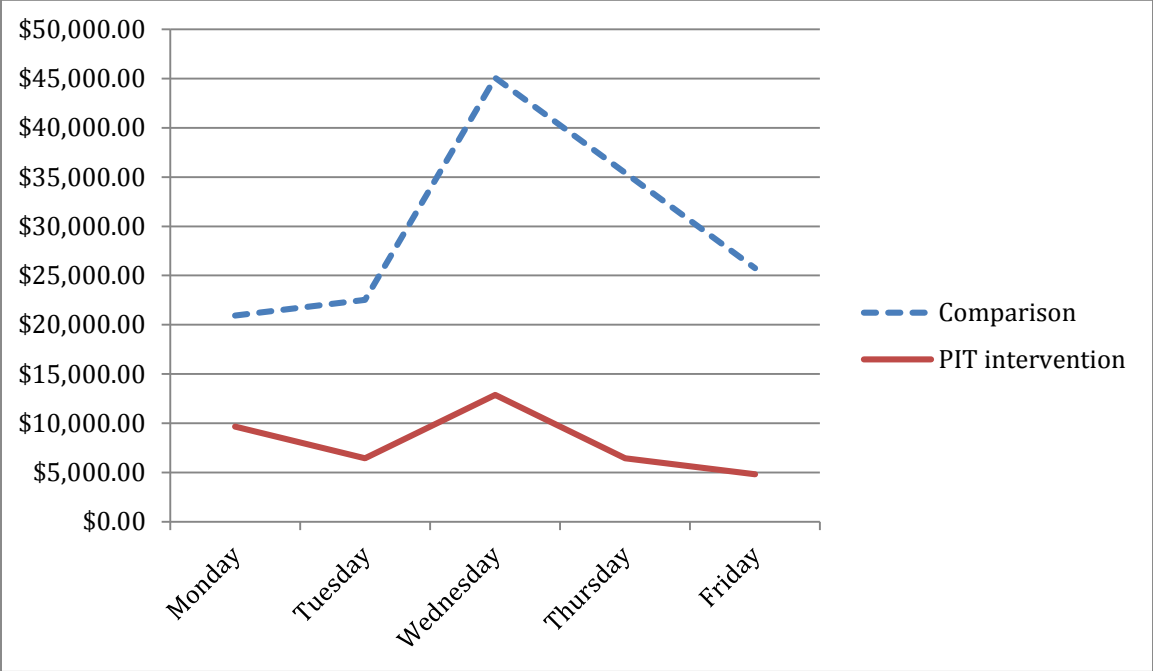
Day	Intervention Week	Comparison Week
Monday	211	272
Tuesday	200	234
Wednesday	192	250
Thursday	195	297
Friday	212	246

Paired t-test results $p=0.0097$

Using a paired t-test, the decrease in LOS is significant. A paired t-test was utilized in order to compare the mean LOS for each individual day of PIT week with the mean LOS for the comparison data of the previous week's coinciding days. This test was utilized in order to compare the means of the PIT intervention LOS with that of the previous week, as a continuous variable, to determine the statistical significance of the change from the intervention. It assists with determining if the LOS differs between the control group, and the group that received the PIT intervention

ED management estimates the lost revenue of a patient who LWBS is \$1,610.00 per visit. The comparison week prior to PIT intervention had 93 patients LWBS, totaling \$149,730.00 in lost revenue. The week of PIT intervention there were 25 patients who LWBS resulting in \$40,250.00 in lost revenue. This number could fluctuate based on patient acuity and testing/interventions. This is a difference of \$109,480 in lost revenue (Table 5).

Table 5. Estimated lost revenue per day, all patients who left without being seen. Pre-intervention (dashed line) compared to intervention week (solid line).



Discussion

In the emergency department, the goal of the staff and facility to provide as efficient, effective, and holistic care to the patients presenting to have emergency health concerns addressed. With high frequencies of patients leaving without being seen, this ED was unable to provide that service to these patients. Multiple factors can contribute to LWBS rates such as long wait times for example. The goal of the project was to develop an innovative plan to assess abilities to decrease LWBS rates and decrease the length of stay for patients.

Based upon the results, the implementation of a provider in triage decreased LWBS rates significantly as well as decreased the overall LOS for discharged patients. The use of the PIT had a positive impact on these factors when comparing the week of intervention to the week prior. The provider during this trial period

was a nurse practitioner providing further support that an advanced practice provider could potentially fill this role as well rather than strictly an attending physician.

With the provider completing the abbreviated exam during the triage process with the registered nurse completing the triage, this decreases the duplicity of questions asked prior to intervention beginning. For example, the patient states their chief complaint for their ED presentation to the RN with the PIT present, and the provider starts their process of PIT immediately after. This is timelier, and decreases patient frustrations with question duplicity. Acting as the PIT, the patients were asked prior to interventions started if they were accepting of the PIT evaluation and interventions being started in the lobby. Although not measured, anecdotally upon questioning the patients regarding the PIT process, they found the approach to be beneficial. They reported feelings of satisfaction with their emergency concerns and symptoms being addressed sooner.

The difference in lost revenue when comparing the PIT intervention week with the week prior control week was greater than \$100,000 for the week. This supports the evidence of PIT providing enough savings to cover the salary of the provider addition, registered nurse addition, and the addition of the patient care technician in order to implement the PIT process. The cost of an APP with benefits would be \$2849.60 per week, \$2411 for the experienced registered nurse that was utilized during the trial period. These figures were calculated by dividing the salary of the individual by the number of hours they work to get their hourly rate, adding 37% for benefits. The cost of these two individuals for the five trial period days is

\$5,260.60; the savings of the PIT from less revenue lost is \$109,480. The return of investment for the facility is \$20.81 for every dollar invested in the PIT, that the hospital saves.

For future studies, longer trial periods could be analyzed as well as patient specific data, provider and patient satisfaction, staffing and cost versus benefit analyses. More specific patient data would be useful from future studies with extended time periods such as the acuity of patients who LWBS, how many patients LWBS who were seen by the PIT, patient perception of wait times (did they actually decrease significantly, or was the perception that they waited less time because their wait times were utilized more efficiently by starting treatment), a more thorough financial analysis, and the frequency of patient returns. The potential is there for patient and staff satisfaction to increase with implementation of a PIT due to earlier start of intervention for patients and decreased stress potential for providers if throughput is facilitated from the beginning of the visit. In addition, with improvement of patient satisfaction, there is the potential of increased volume and patient visits as they are satisfied with the care they receive here, feel their needs are addressed sooner, and would be less likely to go to other EDs in the city.

Ultimately, the evidence demonstrates that utilizing a PIT can improve the overall experience of patients in the emergency department. This provider could not only decrease the high frequency of LWBS rates but decrease overall LOS for discharged patients, improve throughput, and assist with fulfilling the ED goals in regards to patient care.

In implementation of the PIT in the ED, resistance to change can occur. The qualities of an effective leader to decrease this resistance would include communication, addressing barriers and concerns immediately, being a collaborator rather than a dictator, and brainstorming with staff. This will improve staff involvement in the change process, addressing barriers as they occur, increasing the likelihood of success.

Limitations

As the project had a limited time frame to be performed, and time of the advanced practice provider (APP) was volunteered, the trial period could only be performed from the hours of 11 o'clock am until 7 o'clock pm. Future studies would benefit from a longer trial period to reduce likelihood of other factors causing the statistical significance. In addition, given the type of intervention being completed, it is not possible to blind the staff.

In this study, aggregate data was assessed. Future study recommendations would be to collect the arrival time of patients, patient acuity, staffing information, and number of patients seen by the ED providers in the comparison weeks, in comparison to the intervention week. Patient data, aside from aggregate data, would yield more detailed information for analysis.

The improvement of LWBS rates and overall LOS for discharged patients after implementation of the provider in triage could be attributed to other factors such as ED flow and throughput based upon staff assignments, patient characteristics (i.e. age or acuity), or other unanticipated factors resulting in ED visit changes. Ultimately, patient specific data would prove useful for future studies. For

this study and time frame, however, the specific patient data was not feasible.

Definite cause and effect is not able to be determined, but association between the factors can be related.

Barriers to the PIT addressed included safety, privacy, staffing, space, and resistance to change. The safety of patients remained the same, as the patients who are unstable are not delayed access to care by PIT evaluation; rather they are immediately placed into a room, and the providers are notified of the concerns of their acuity. Privacy was addressed by having the doors and blinds of the triage rooms closed while asking the patients questions and performing their focused exams.

During completion of the PIT trial period, the PIT was assigned a RN solely for their use to administer medications and draw labs. This proved effective, however additional staffing would be needed to implement fully. The PIT would assist the RN with lab draws and urinalysis completions when the RN was with other patients in PIT in order to prevent delays. Having a patient care technician assigned to PIT, in addition to the RN, would assist with efficient throughput.

The space of the ED is limited. This setting had a new ED renovation that opened in 2005, and just recently renovated offices and locker rooms to add an additional four treatment rooms for fast track patients. However, additional renovations are limited due to spacing. Therefore, the importance of configuration of the space for utilizing it more efficiently is essential. In triage, there are carts to lay patients on while obtaining an electrocardiogram (EKG). However, if an EKG is not being performed, these carts and this space are frequently unused. These carts

were used for patients obtaining lab draws, and for medication administration during the PIT process, which effectively demonstrated improved use of the space.

Staff resistance to change was address through communication, and alterations of the process. There was a specific RN designated to the PIT, who was the same RN four of the five trial days. This RN and the PIT would discuss daily was effective, and what was not in order to change to improve in real time. In addition, the PIT would communicate with nursing staff and provider staff during the intervention to determine if there were additional tests they would need ordered in the process, if it was interfering with their patient care techniques, their thoughts regarding the process, and where improvements were needed. Staff feedback was positive, and they had the impression this improved ED flow and access to more patients.

Impact on the emergency department

The goals of emergency department standards are to see patients when they have an emergent condition. The facility goals include having as few patients as possible leaving without being seen, decreasing length of stay, increasing throughput, and decreasing wait times in order to provide timely care to the patients presenting for evaluation. Implementing the provider in triage for this study shows statistical significance in achieving these goals. Clinically, it is significant as the overall LOS and LWBS rates for patients dramatically decreased, providing the ability to increase throughput of patients.

Revenue would not necessarily be lost by decreasing length of stay, unless

the patient was a critical care patient. However, by decreasing the frequency of patients leaving without being seen, revenue should be positively impacted. Further studies would be necessary to analyze the financial implications of PIT. The comparison could be made analyzing the cost difference in lost revenue saved by fewer patients LWBS, in comparison to the cost of paying for additional staff each day for the PIT shift.

Chapter 5: Summary

Study Summary

Based upon increased rates of left without being seen (LWBS) in the emergency department, the innovative plan of trialing a provider in triage (PIT) was created. The literature reviewed supported positive outcomes on LWBS rates and overall length of stay (LOS) for patients in the emergency departments and supported premise for promoting the trial of PIT.

The PIT was implemented for one week, Monday through Friday, encompassing as many of the high volume hours as possible volunteering time as an advanced practice provider (APP); this occurred from eleven o'clock am, until seven o'clock pm. The PIT performed a brief exam of patients in the lobby upon triage completion, and ordered appropriate lab testing, radiology testing, and non-controlled medications for symptomatic improvement. The patients were then roomed once a bed became available and their full exam and evaluation took place at that time along with review of their results.

Upon comparing the week of intervention (Monday-Friday) with the week prior to the intervention (Monday-Friday), the PIT appears to have had a statistical impact. The LWBS rates decreased dramatically from 11.6% to 3.5%, and the overall LOS for discharged patients improved. The average LOS for the intervention week was 202 minutes, in comparison with the average LOS of 259.8 minutes in the comparison week prior. This was an improvement of 57.8 minutes.

Ultimately, the PIT is an ED solution to systemic problems. Not only are EDs overcrowded due to increased ED volume and visits, but also secondary to

throughput and system barriers. These include boarding of patients in the ED while they wait an admission bed, spacing concerns for not only ED patients but admitted patients, and staffing concerns. For example, even if there is an open room for a patient on the admitted floor, if there is staffing shortage on that floor, the room is unable to be used and the patient is boarded in the ED until another becomes available. This delays their admission orders, care, and throughput of the ED.

The staff of this specific study setting has effective communication, collaborates together efficiently. Staff cohesiveness exists not only on perceived unity of the ED, but also in relation to tasks. The staff collaborate and communicate on areas of barriers and successes.

Implications for Nursing Practice

Evidence based practice (EBP) integrates research on a topic of interest, clinical expertise, identification of individualized characteristics and uniqueness, and values. This type of practice uses this knowledge to promote health and care to a population, going as far as tailoring it to their specific characteristics and environmental influences. EBP encourages providers and facilities to implement the best treatment methods, care, and healthcare processes to their consumers. Quality improvement initiatives coincide with EBP by focusing on an area of improvement with the aim and goal that it could improve health outcomes, facility efficiency, collaboration, and have an impact on health disparities (Weinick & Hasnain-Wynia, 2011).

The results of the project support the potential of a PIT to decrease frequencies of patients LWBS, and increasing throughput by decreasing LOS for

discharged patients. Implementation of a PIT on a full time basis would require the collaboration of all staff in order to be successful. The provider and the nursing staff would collaborate to determine the process most successful to potential throughput based upon communication about patient problems relative to what is going well and how to increase likelihood of success. For the nursing staff, not only would it be necessary for them to continue their tasks as nurses, but to contribute input and recommendations as active participants in the change process.

This type of intervention would not only increase throughput and decrease LWBS rate, but could potentially improve other factors. For example, if patients have effective use of their time spent in the lobby waiting, such as having labs and imaging studies completed, they will feel as though more time is used to address their emergency needs. This can lead to an increase trust in the facility, as patients will feel that the ED is responsive to their emergency by addressing their health concerns in a timely fashion. The potential for less frequent patient dissatisfaction regarding wait times should result from this approach. If the advanced practice provider continues to prove effective in this role, it could lead to additional clinics to address the population needs.

Conclusions

The results of the project support the potential of a PIT to decrease frequencies of patients LWBS and increasing throughput by decreasing LOS for discharged patients. This type of intervention would not only increase throughput and decrease LWBS rate but could potentially improve other factors. Future studies could focus upon longer trial periods, patient specific rather than aggregate data,

staffing, satisfaction (patient and staff) to name but a few. The recommendations from the project would be to perform a longer trial period for comparison to present to administration for analysis.

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